

This lesson is part of a larger, comprehensive school garden guide called **Minnesota School Gardens: A Guide to Gardening and Plant Science** developed by Minnesota Agriculture in the Classroom in 2013. The entire guide is available at [www.mda.state.mn.us/maitc](http://www.mda.state.mn.us/maitc).



## Grade

Middle School

### Materials/Preparation

- ☐ Teacher Material A – Parts of a Plant – one per teacher
- ☐ Teacher Material B – Edible Plant Parts – one per teacher
- ☐ Handout A – Salad Investigation Report - one per student
- ☐ Assessment A – Salad Investigation – one per student
- ☐ Paring knife
- ☐ Salad ingredients: Enough to make each student one small salad each with seven of the following: carrots, lettuce, tomatoes, sunflower seeds, celery, broccoli, cucumbers, mandarin oranges
- ☐ Plates, napkins, and forks – one set per student
- ☐ Variety of salad dressings
- ☐ Writing utensils

*Before class begins, prepare enough miniature salads for each student in the class to have one. Choose seven plant foods from the Materials list or add your own. Salads should include samples of at least one of each of the six basic plant parts. (Suggestion: have salads prepared and set at each student's individual seat with a fork and napkin). Display Teacher Material A on a large board or suitable wall space.*

# Salad Investigation

## Minnesota K-12 Academic Standards

|         |         |                                                                                                                                       |
|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------|
| Science | 7.4.1.1 | Tissues, organs and organ systems are composed of cells and function to serve the needs of all cells for food, air and waste removal. |
| Health  | 6.6.1   | The student will apply strategies and skills needed to attain personal health goals.                                                  |

### Summary/Overview

Students learn about edible plant parts and the difference between fruits and vegetables while eating a salad.

### Garden Connection

Students identify the parts of plants used to make a salad.

### Background Information

Plants are the most important source of food in the world (both for humans and animals). All the fruits, vegetables, and starches we enjoy each day come from the six distinct parts of plants: roots, stems, leaves, flowers, seeds, and fruits. Edible plant parts are classified as either vegetables or fruits. *Vegetables* are any edible part of the plant that is not the fruit. This includes foods that are leaves, roots, stems, flowers, and seeds. Technically, *fruits* that we consume (apples and oranges, for example) are the fruiting body of the plant. Believe it or not, ketchup is a fruit product because it is derived from the fruit of a tomato plant.

### Objectives

- Cite five examples of edible plant parts.
- Explain the difference between fruits and vegetables.

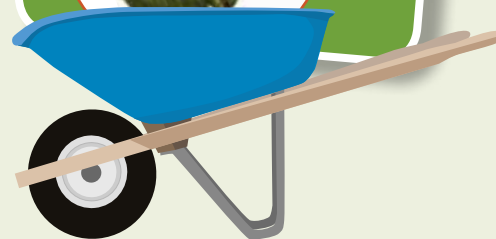
### Procedure

#### Interest Approach

Tell students not to touch the salad, napkin, or fork on their desk. Have them wash their hands. Or you may wish to provide hand-sanitizing gel. Provide students with copies of Handout A. Invite them to be detectives investigating their salad and name the seven different food components on the Salad

#### Fun Fact

An apple is in the pome family – a fruit whose seeds are embedded in the core of the fruit. Another surprising member of this family is the rose.



Investigation Report. Point out the “salad component” section on the worksheet. Provide students with three minutes to complete this one column. Verbally review each component of the salad.

## Summary of Content and Teaching Strategies

Review the parts of the plant. Display Teacher Material A and have students point out the plant parts. Plants are the most important source of food in the world (both for humans and animals). The fruits, vegetables, and starches we enjoy each day come from different parts of the plants. These foods are all one of the six main plant parts: roots, stems, leaves, flowers, seeds, and fruits.

Discuss the difference between fruits and vegetables. Decide whether each of the salad foods is a fruit or vegetable, and what part of the plant it is. Ask students to do this activity in pencil so they can go through each one and correct any answers that need to be rethought. Invite them to add other foods that come from this same part of the plant.

Discuss commonly misnamed fruits and vegetables. There is a simple way to remember the difference. Vegetables are any edible part of the plant that is not the fruit. This includes foods that are leaves, roots, stems, flowers, and seeds. Discuss information on **Teacher Material B**. Point out these plant parts on **Teacher Material A**. Discuss the vegetables and fruits students listed on their Salad Investigation Reports. The reports should now be completed. Provide salad dressing and invite students to eat their salad.



## Review/Summary

Have students answer the following questions in small groups:

1. What part of the plant is lettuce?
2. Is a cucumber a fruit or vegetable? (Fruit; seeds are inside)
3. Name an example of a vegetable. (Lettuce, carrots, turnips, lima beans, etc.)
4. Is ketchup a fruit or vegetable product? (Fruit because it comes from tomatoes, which are the fruit of the tomato plant.)

## Modifications/Extensions

Have students do a fanciful Complete Salad Plant activity. Students draw single plants that could be a complete salad; their parts are made of the foods discussed in the lesson (carrots, lettuce, tomatoes, sunflower seeds, celery, broccoli, cucumbers, mandarin oranges). Students label each plant part with the name of the food and which of the six basic plants is represented (for example: lettuce leaves, carrot roots). Have students share their drawings with classmates. Post these in the classroom as a fun reminder of the origins of their salad.

Challenge students to use the knowledge they gained from this lesson to write three healthy eating goals for themselves. The goals should relate to eating a variety of healthy foods and include foods from each plant part.



### Sources/Credits

Adapted from: National FFA Organization Middle School Food and Agricultural Literacy Curriculum, sponsored by the National Pork Board as a special project of the National FFA Foundation. Visit [www.ffa.org/documents/learn/MS.PS.1.3.pdf](http://www.ffa.org/documents/learn/MS.PS.1.3.pdf) to access the full length version of this lesson.



# Parts of a Plant

## Leaves Functions:

1. Site of photosynthesis
2. Absorbs sunlight to produce energy
3. Site of the majority of transpiration

## Flower Functions:

1. Site of reproduction
2. Contain male and/or female parts
3. Can be bright and fragrant to attract pollinators

## Stems Functions:

1. Channel of water, nutrient, and sugar transportation throughout the plant
2. Supports buds and leaves

## Fruit Functions:

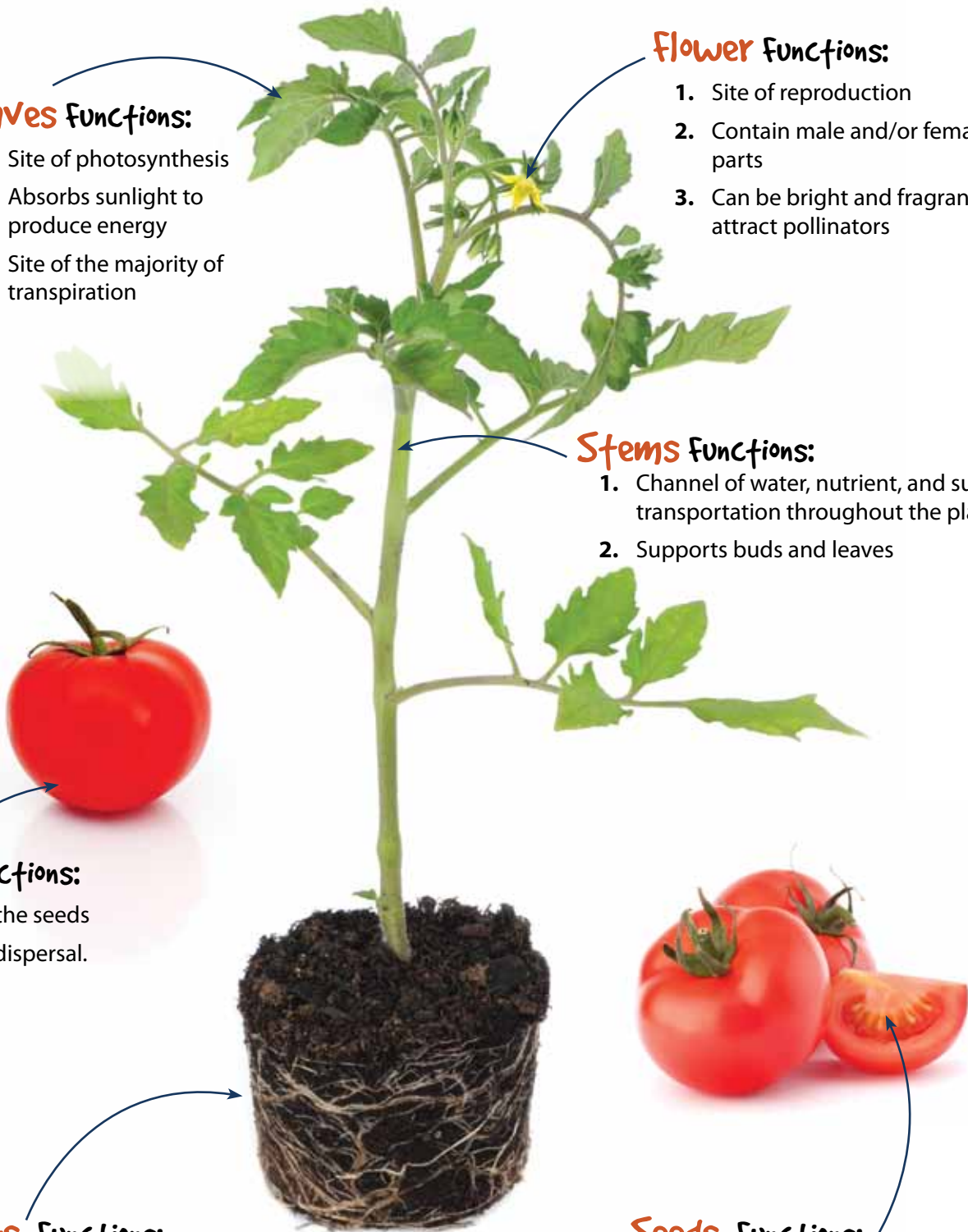
1. Protect the seeds
2. Help in dispersal. How?

## Roots Functions:

1. Absorb water and minerals from the soil
2. Anchor plant to ground
3. Support stem structure

## Seeds Functions:

1. Contain the embryo which will become new plants



# Edible Plant Parts

**A.** Plants are the most important source of food in the world (both for humans and animals). The fruits, vegetables, and starches we enjoy each day come from different parts of the plants. All these foods are one of the six main plant parts: roots, stems, leaves, flowers, seeds, and fruits. Edible plant parts are classified as either vegetables or fruits.

**B. Vegetables:** Vegetables are any edible part of the plant that is not the fruit. This includes foods that are leaves, roots, stems, flowers, and seeds.

1. **Roots:** Roots collect water and minerals from the soil. Roots are also used for energy and food storage for some plants. Examples of edible roots include carrots, beets, turnips, and rutabaga.
2. **Stems:** Stems transport water and minerals from the roots to the rest of the plant and transport the energy created by photosynthesis from the roots to the rest of the plant. Commonly eaten stem parts include celery, onions, and potatoes. Potatoes are actually modified stems that plants use to store energy, which is why they are such a great source of energy.
3. **Leaves:** Leaves are the primary site of photosynthesis in plants. They are also the site of transpiration. Leaves are a great source of many vitamins needed for healthy humans and animals. Commonly consumed leaf foods include lettuce, kale, spinach, cabbage, collards, and mustard greens.

4. **Flowers:** Flowers are the reproductive structure in plants and can contain male (stamen) and/or female (pistil) structures. Flowers are usually the flashiest part of the plant in order to attract pollinators. Many flowers are common foods for humans including broccoli and cauliflower.
5. **Seeds:** Seeds are the mature ovules that are originally found in the female part of the flower and are usually housed in a type of fruit or cone. Seeds contain the embryo, which will germinate and become a new plant. Common edible seeds include lima beans, peas, sunflower seeds, green beans, and pinto beans.

**C. Fruits:** Technically, fruits that we consume (apples and oranges, for example) are the fruiting body of the plant..

Fruits are formed from the fertilized ovule (seeds) and the ovary walls of the female part of the flower. The fruit protects the seed and assists in the dispersal of seeds (by attracting animals that may consume the fruit and disperse the seed). Edible fruits include apples, oranges, and strawberries. Although they are often called vegetables, tomatoes and cucumbers are also the fruit of the plant.

## Vocabulary Words

**Ovules:** small eggs found in the female part of the flower

**Photosynthesis:** the process by which plants use energy from the sun, carbon dioxide, and water to make food

**Pollinator:** an agent that transfers flower pollen from the male anthers to the female stigma

**Transpiration:** water evaporation from leaves

Name \_\_\_\_\_



# Salad Investigation Report

As we explore the components of our salads, fill in the following chart. **First**, list the seven components. **Second**, determine whether the food is a vegetable or fruit and write a V or F in the box. **Third**, name what part of the plant it is (root, stem, leaves, flowers, fruit, or seeds). Finally, list 3-4 examples of other plant foods that are from the same part of the plant as the component.

| Salad component | Fruit or Vegetable? | Part of Plant | other Foods from this Plant Part |
|-----------------|---------------------|---------------|----------------------------------|
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|                 |                     |               |                                  |



# Salad Investigation

Determine whether each food is a fruit or vegetable. In the third column, name the part of the plant the food is. Use the list of basic plant parts below.

| Plant Parts |      |        |        |      |       |
|-------------|------|--------|--------|------|-------|
| Root        | Stem | Leaves | Flower | Seed | Fruit |

| Name of Food  | Fruit or Vegetable | Plant Part |
|---------------|--------------------|------------|
| Turnip Greens | 1.                 | 2.         |
| Carrots       | 3.                 | 4.         |
| Lima Beans    | 5.                 | 6.         |
| Tomato        | 7.                 | 8.         |
| Celery        | 9.                 | 10.        |
| Broccoli      | 11.                | 12.        |